HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Kalama Creek Hatchery
Species or Hatchery Stock:	Fall Coho
Agency/Operator:	Nisqually Indian Tribe
Watershed and Region:	Nisqually River, WRIA 11, Puget Sound
Date Submitted:	April 11, 2003
Date Last Updated:	April 10, 2003

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.
Kalama Creek Hatchery

1.2) Species and population (or stock) under propagation, and ESA status.
Coho (Oncorhynchus kisutch), Hatchery stock (Unlisted).

1.3) Responsible organization and individuals

Indicate lead contact and on-site operations staff lead.

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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

1.4) Funding source, staffing level, and annual hatchery program operational costs.
The Bureau of Indian Affairs is the funding source for this program. Staffing level is 3.4 FTE's.

1.5 Location(s) of hatchery and associated facilities.
Kalama Creek (WRIA 11.0017A) is a left bank tributary located at RM 9.2 on the Nisqually River, Puget Sound, Washington. The facility is located at RM 0.2 of Kalama Creek.

1.6 Type of program.
Isolated Harvest

1.7 Purpose (Goal) of program.
The purpose of this program is to provide for treaty reserved fishing opportunity for the Nisqually Tribe and other treaty and non-treaty Puget Sound fisheries.

1.8 Justification for the program.

The Nisqually Tribe has developed a community goal of providing an annual in river treaty harvest of 15,000 – 20,000 coho salmon. In order to meet these goals, the Tribe has developed a substantial artificial production program at this facility and it's Clear Creek hatchery.

Past artificial production and harvest management practices have had serious impacts on the viability of the natural coho salmon in the Nisqually River. Since the 1940's, southern Puget Sound Coho have experienced harvest rates directed at major artificial production facilities these levels were too high to sustain natural production. Hatchery fish from at least seven different brood stocks have been released or out planted from Nisqually River and other Puget Sound facilities since at least 1943. Between 1943 and 1981 over 14 million Coho were released throughout the watershed with an average annual release of over 360,000 fish. From 1982 through 1995 hatchery coho out planting and releases into the Nisqually River totaled over 27 million fish with an average yearly release of over 1.9 million fish. Coho have been released in at least 13 different tributaries and the main stem Nisqually. Fisheries in the Nisqually River, as well as the rest of southern Puget Sound, have been managed solely for hatchery escapement needs and routinely subject coho stocks to harvest rates in excess of those appropriate for natural stocks.

The artificial production program described here will be operated using risk reduction actions that are designed to control potential negative ecological interactions while providing a meaningful treaty and non-treaty fishery. Specific actions will include reduction of ecological risks by maintaining spatial separation from listed natural stocks as well as actions to reduce predation on those stocks. Specific actions in these areas will be discussed in further detail in the appropriate sections of this hatchery and genetic management plan (HGMP).

1.9) List of program "Performance Standards".

Goal	Performance Standards	Performance Indicator
Produce fish to meet harvest needs	Hatchery production provides adult returns to terminal areas to meet Tribal treaty harvest rights and provide escapement to hatchery rack as defined in Management Plan	Monitor tribal fish tickets
	Fishery management provides for harvest needs and meets escapement goals for natural and hatchery returns	A average of 500 adults return to hatchery rack annually for brood stock
		Estimated escapement of natural spawners on average reaches goal of 4,000 adults

	Rearing practices maximize survival from egg to release	The rate of fertilization and survival from egg to smolt provides for production goal of 350,000 smolts
Maintain genetic diversity of hatchery stock	Maintain large effective population size	Number of hatchery spawners maintained at an average of 500
	Follow spawning protocol to increase effective population size	Utilize modified 6*6 factorial spawning protocol
	Minimize changes in migratory behavior of hatchery stock	Broodstock collected through-out range of migration to the rack, from mid September to early December
Control potential negative genetic impacts on natural spawners	Reduce potential straying of hatchery production by: • Utilizing Nisqually hatchery returns of Minter or Soos creek origin • Location of facility on a separate tributary in lower main stem, with distinct water source.	Due to coho currently not being mass marked there is no way to identify Hatchery strays. It is our intention to begin mass marking coho with BY 2002 if funding is available.
Control potential negative ecological impacts on naturally produced juveniles	Minimize impacts of juvenile hatchery releases on naturally produced juveniles	Hatchery smolt size is maintained at minimum of 19 fish per pound to maximize probability of immediate out migration
		Hatchery smolts released below RM 9.2 to minimize interaction with naturally produced juveniles
		On station releases only, no tributary supplementation.

1.10) List of program "Performance Indicators", designated by "benefits" and "risks."
See table in Section 1.9

1.11) Expected size of program.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish). The average annual broodstock needs for this program will be 500 adults. These fish will be derived from hatchery returns and will not require the mining of natural stocks. The average escapement to this facility from brood years 1990 through 2001 has been 1810 adults per year. During this period, escapements have ranged from a low of 533 adults in 2000 to a maximum of 5215 adults in 1992. Annual escapement to the facility has been as follows:

Brood Year	# Males	# Females	#Jacks
1990	1531	895	36
1991	1041	887	188
1992	3182	2033	323
1993	2106*		630
1994	1640	2106	527
1995	658	658	288
1996	672	524	60
1997	1,619*		19
1998 (A)	384*		30
1999 (B)	242*		0
2000 (A)	250	283	10
2001	1,010*		0
2002 (C)	0	0	0

* Both sexes represented
(A) changed to Minter Creek stock no eggs taken
(B) No eggs available from Minter Creek no fish reared
(C) Minter Creek brood tested positive for VHS replaced with Soos Creek eggs

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location. (*Use standardized life stage definitions by species presented in* Attachment 2).

Life Stage	Release Location	Annual Release Level
Eyed Eggs		
Unfed Fry		
Fry		
Fingerling		
Yearling	On-station, RM 9.2 Nisqually R.	350,000 @19 FPP

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

Estimated smolt-adult survival rates for the program for brood years 1986 – 1996 are presented below. !997 – 2002 results will be added with an updated HGMP in the near future. Survival rates include total estimated recoveries in fisheries and escapement.

Smolt-to Adult Survival Rates:

Brood Year	Est. Total Survival Rate (%)	Est. Survival to Nisqually River (%)
1986	2.07	0.37
1987	2.82	0.92
1988	2.26	0.58
1989	2.34	1.00
1990	1.05	0.51
1991	2.39	0.90
1992	1.69	0.48
1993	.69	0.31
1994	.33	0.19
Mean BY 1986 - 1994	1.7	0.58

Program goals are to achieve total survival rates from 1.8% to 2.3% survival to the Nisqually River.

Adult Production Levels:

Brood Year	Estimated Adult Production (including jacks) From CRAS
1985	18717
1986	10250
1987	13601
1988	21000
1989	11479
1990	4412
1991	10398
1992	6724
1993	1822
1995	1439
1996	32*
Mean BY 85-1996	9079

* Cwt information still coming in

The program goal for a release of 350,000 yearlings is to achieve adult production levels to all fisheries and escapement of between 6,300 and 8,050 fish to the Nisqually River.

Estimated Escapement Contribution:

Brood Year	Estimated Escapement Contribution
1985	2990
1986	1062
1987	1430
1988	1140
1989	1172
1990	493
1991	1172
1992	893
1993	325
1994	166

Escapement needs for the program at full production of 350,000 fingerlings will require an average of 500 of fish.

(All figures reported in Section 1.12 are derived from CRAS coded wire tag recovery reports for brood years 1985 – 1994.)

1.13 Date program started (years in operation), or is expected to start.
Program began with fish releases in 1980 (Brood year 1979).

1.14) Expected duration of program.
This program is being evaluated and changes are being made in regard to hatchery techniques. These changes include delayed releases, 6x6 spawning, utilizing a south sound stock. These changes are in conjunction with the multi-species recovery plan being developed by the Nisqually Tribe. The primary goal of this program is to produce 15-20,000 coho for the Tribe's in-river fishery. The program is being assessed on a yearly basis.

Watersheds targeted by program.
Nisqually River, WRIA 11, Puget Sound

1.15) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.
The Tribe has attempted to reach this goal by several different approaches, including no on-station artificial production (out planting of hatchery fish from other Puget Sound watersheds), artificial production from the Kalama Creek hatchery along with out planting, and finally, operation of Kalama Creek along with the development of the Clear Creek program. The current approach of on-station production of coho smolts has the lowest potential for negative ecological interactions, and should have the highest

likelihood to meet the tribal fishery goals. We are delaying egg development by the use of a water chiller to produce a more normal time emergence. We are also attempting to control growth to produce a more natural growth curve. These efforts and the use of a local South Sound stock should help this program to meet it's goals.

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

2.1) List all ESA permits or authorizations in hand for the hatchery program.
Tribe has submitted HGMP's consistent with 4d exemption criteria and they are being reviewed.

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.
No known take of listed fish in this hatchery program.

2.2.1) Description of ESA-listed salmonid population(s) affected by the program.
Much of this requested information is available for the composite Nisqually River chinook stock, but due to the current inability to distinguish hatchery origin fish from naturally produced fish, it is impossible to describe these population characteristics for the listed stock. Despite this limitation, information about the distribution of adult spawners is provided below.

Distribution and Timing of Naturally Spawning Fall Chinook
Fall chinook spawn throughout the main stem from approximately RM 15 to approximately RM 40, as well as in the major tributaries of the Nisqually River including the Mashel River, and Ohop and Yelm Creeks. Total escapement estimates are generated by expansion of peak counts from index areas on the main stem and the Mashel River. An accurate estimation of spawning distribution of fall chinook is nearly impossible in the main stem due to extremely poor visibility from glacial runoff during the fall and early winter, however, the information that we have indicate that a major proportion of the spawning occurs in the main stem, between RM 21.8 and RM 26.2.

Spawning occurs between mid-September and early November, with peak spawning generally occurring the first or second week of October.

- **Identify the ESA-listed population(s) that will be directly affected by the program.**
  No ESA-listed population is directly used in this program.

- **Identify the ESA-listed population(s) that may be incidentally affected by the program.**
  Some natural origin Nisqually River fall chinook may voluntarily exit the Nisqually River into Kalama Creek and be captured during the collection of coho Brood stock. This number is believed to be extremely low due to the location of the brood stock collection area, the water chemistry of the facility, and the flow of the hatchery creek in comparison to the main stem Nisqually River. The adult collection facility is

located approximately 0.2 miles upstream on Kalama Creek, a tributary to the Nisqually River. The hatchery water source is spring fed in origin and flows through a large wetland on the hatchery site. It is believed to differ in water chemistry from the glacially influenced main stem. The hatchery creek flow during adult chinook migration is also significantly lower than the flow in the mainstem, approximately 5 cubic feet per second compared to approximately 900 cubic feet per second. This difference as well would make it unlikely for a listed stock to be used in the program.

Listed fall chinook juveniles may also be incidentally affected through the release of juveniles for this program. Potential negative ecological and genetic impacts from juvenile releases will be minimized by providing temporal and spatial separation from program fish releases. Methods to minimize these interactions are described in other sections of this HGMP.

2.2.2) Status of ESA-listed salmonid population(s) affected by the program.

- **Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds.**
  The status of the composite Nisqually River fall chinook population would be considered to be above the viable population threshold. The average escapement estimate for this composite stock from 1988 – 1999 has been 1092 fish. The actual composition of the stock (natural vs. hatchery origin) is unknown. Escapement estimates for 1988 – 1994 were likely highly influenced by returning hatchery fish from the Schorno Springs facility spawning in the mainstem river. This facility, closed in 1992 in favor of on-station releases at Clear Creek, was a release site only, and returning adults would not have been segregated from natural origin Chinook.

- **Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.**
  Mass marked fish are beginning to return in significant numbers so imformation will become available in future years.

- **Provide the most recent 12 year annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.**
  Hatchery Rack is Adults only from Hatchery records.
  Natural escapement estimates and Tribal catch are from Nisqually Tribal spawning ground estimates and fish tickets.

Return Year	Hatchery Rack	Nat. Escapement	Tribal Catch
1990	994	994	4,278
1991	953	953	419
1992	106	1,730	301
1993	1,655	2,104	4,024
1994	1,730	3,623	6,183

Return Year	Hatchery Rack	Nat. Escapement	Tribal Catch
1995	817	817	7,171
1996	606	606	5,365
1997	340	340	4,309
1998	834	834	7,990
1999	2,348	1,399	14,614
2000	1,172	1,253	6,836
2001	518	1,079	14,098
2002	1,299	1,542	11,703

- **Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.**
  The premise of the Nisqually River Chinook recovery plan is that Nor's are of hatchery (Green River) origin given the long history of releases of chinook into the Nisqually river. This was verified with a genetic study conducted in 2000 and 2001. With the return of marked fish last year 2002 a change in ratio study was started, funded with Hatchery Reform funds to determine the stray rate of hatchery fish onto the spawning grounds.

2.2.1) **- Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take**.

None of the categories in the take table apply to this program. Since there is, however, a chance that a naturally produced fall chinook could voluntarily swim into the adult collection facility, brood stock collection directed at hatchery coho has a "low" potential to take listed fall chinook salmon. If straying of natural fish into the facility does occur, it is doubtful that this number is significant. The estuary study as described in Section 12 has take of listed stock this take is accounted for under tribal research submitted by NWIFC as part of the 4d exemption.

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.

Do to the previous lack of identifiable marks in the chinook population no information is known.

- Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).

Take of natural origin fall chinook adults was accounted for in the fall chinook HGMP for this facility.

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.
No plan exists at this time.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.
No ESU-wide hatchery plan exists at this time for Coho salmon.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.
This program operates under and is consistent with several court orders and agreements. These include U.S. v. Washington, and subsequent orders including the Puget Sound Salmon Management Plan, and the Nisqually River Management Plan.

3.3) Relationship to harvest objectives.
The Nisqually River fall coho population has been managed as a composite stock (hatchery + natural), with the primary harvest objective of providing the required escapement for hatchery production as well as achieving a natural escapement of 4000 fish. To accomplish this the Nisqually Tribe is currently evaluating Minter Creek and Soos Creek as a brood source for the Nisqually River and making changes in fish culture regimes within the program aimed at meeting this objective. Additionally, the multi-species plan currently being developed by the Tribe will help direct the future coho program.

3.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1985-94), if available.
Fisheries benefiting from this program include Canadian fisheries (sport, net, and troll), Washington fisheries including pre-terminal treaty and non-treaty fisheries, and terminal treaty harvest primarily by the Nisqually Indian Tribe in the Nisqually River and McAllister Creek fishing areas. Estimated harvest levels by fishery are provided below. An estimate of future harvest rates on the listed stock is provided in 3.3 above.

Fishery	B. C.	OR	WA General	Treaty Term.	Total
BY 85	4440	535	7831	5227	18033
BY 86	3732	4425	66	1873	10095
BY 87	3970	5160	0	4444	13574

Fishery	B. C.	OR	WA General	Treaty Term.	Total
BY 88	3977	4032	59	2778	10846
BY 89	2333	3857	32	4872	11094
BY 90	1402	970	0	2271	4643
BY 91	5227	898	0	4073	10198
BY 92	3384	1384	0	1923	6691
BY 93	640	360	0	882	1882
BY 94	254	330	0	833	1417

3.4) Relationship to habitat protection and recovery strategies.

The Nisqually Tribe has developed an extensive habitat protection and restoration framework and action plan focusing that will provide benefits for listed fall chinook as well as other anadromous species. Selective habitat restoration projects in the Nisqually River estuary, main stem, and tributaries, along with protection of existing conditions elsewhere are projected to provide significant improvement for all naturally produced salmon in the Nisqually River. The complete habitat action work plan for the Nisqually basin can be found in the Nisqually Basin Fall Chinook Recovery Plan.

3.5) Ecological interactions.

In order to keep the response to a reasonable length, the discussion here will generally be limited to interactions between the program fish and listed species. Some discussion of interaction with other salmonid species will be provided.

Predation – Program coho salmon may prey on listed Nisqually River fall chinook during several life stages in the freshwater, estuarine, and marine environment. In addition, the offspring of program coho that may reproduce in the wild may also prey on the listed stock. It is likely that predation on naturally produced chinook by hatchery produced coho, in some cases, will be significant. The answer to this question may be determined in the tribes ongoing study in the lower river and estuary (see section 12). The Special Interaction Workgroup (SIWG) formed under the Salmon and Steelhead Conservation and Enhancement Act of 1980 categorized this risk as unknown during freshwater and estuarine life stages, primarily since there was little documentation of these interactions. Actions can be taken to minimize the risk of predation, including the type of fish that are released and when, and how the fish are released. In the case of the program fish, all are volitionally released in the lower 6.3 miles of the Nisqually River as actively migrating smolts thus reducing duration of overlaps in time and space. The risk of freshwater and early marine predation by program fish is categorized as unknown for interactions with steelhead and coho salmon, and high for pink and chum salmon (SIWG). Actions to minimize the risk of predation to these species are the same as described for interactions with the listed stock.

Competition – Program coho salmon may compete with listed Nisqually River fall chinook for food and space in the freshwater, estuarine, and marine environment. The answer to this question may be determined in the tribes ongoing study in the lower river and estuary (see section 12). The risk of competition is categorized by the SIWG as high in freshwater and unknown in early marine life. The release of non-migratory coho is believed to pose the highest risk due to competition. To reduce the risk of this interaction with the listed stock, the program will volitionally release smolts in the lower 9.3 river miles to minimize the duration of this interaction.

The risk of freshwater competition by program fish is categorized as high for interactions with steelhead and coho salmon, and low for pink and chum salmon (SIWG). The risk of competition by program fish in early marine life stages is categorized as high for interactions with naturally produced coho and unknown for interactions with steelhead, pink and chum salmon. Actions to minimize the risk of competition with these species are the same as described for interactions with the listed stock.

Disease Transmission – Hatchery effluent has the potential to transport pathogens from the hatchery water supply to receiving water containing listed and other stocks. Pathogens may also be transmitted by direct contact of infected hatchery fish with other stocks. Although these methods of disease transmission are possible, there is little information showing that pathogens are transferred to naturally produced stocks. This program is operated under the disease prevention and detection guidelines established in the "Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State. These practices should minimize this risk for both listed and other stocks.

Effects of Hatchery Effluent – Hatchery effluent may alter various properties of the receiving water used by listed and other stocks. These properties include suspended solids; settle able solids, temperature, dissolved oxygen, biological oxygen demand, and nutrient. At this time we do not operate under a NPDES. When the EPA issues a general permit will have no problem complying.

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

Kalama Creek is a small independent tributary of the Nisqually River that originates on the Nisqually Indian Reservation and enters the river at approximately RM 9.2. Additional water is collected from a spring source on the reservation. Kalama Creek's maximum flow during coho returns of 6 cubic feet per second (cfs) in comparison to main stem flow of 750 – 900 cfs, provides little if any attraction flow for naturally produced fish.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

As indicated in section 4.1. The hatchery is located on an independent tributary of the Nisqually River. Use by fall chinook is thought to be limited to adults returning from the hatchery program. All intakes are screened and located above the adult capture pond. A low risk exists that a listed naturally produced chinook may voluntarily turn into Kalama Creek, swim 0.2 miles to the hatchery pond, and be incorporated in the brood stock. This is minimized by the presumed chemical difference between the hatchery water supply and the glacial main stem Nisqually. Kalama Creek's flow during fall chinook returns of approximately 6 cfs in comparison to main stem flow of 750 – 900 cfs, also provides little attraction flow for naturally produced chinook.

Risk of take of listed fish is minimized by properly sized and located screens, and by properly disposing of fish waste's regularly into upland areas resulting in clean effluent discharges. Currently no water is being used so ground water withdrawal is not an issue.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Brood stock is collected and held in a 36,000 cubic foot adult capture pond supplied with approximately 3000 gallons per minute (gpm) of water. No brood stock is collected in the Nisqually River. All brood stock captured must voluntarily turn out of the mainstem Nisqually and traverse the creek and fish ladder to be captured.

5.2) Fish transportation equipment (description of pen, tank truck, or container used).

The facility uses transport equipment only when transferring fish from raceways into large rearing ponds or for splitting the population between the two large rearing ponds. This occurs twice in the spring with fish weighing between 150 – 600 fish per pound. The transfer is an on-station transfer of a maximum of one-half mile. The transfer equipment consists of a 350 gallon insulated fiberglass transfer tank with oxygen supply. Loading for the on-station transfer is generally limited to 300 pounds of fish per load, with 3 liter per minute of oxygen supplied to the tank.

5.3) Broodstock holding and spawning facilities.

See 5.1 above for brood stock holding facility. Spawning takes place at the adult capture pond in a covered spawning area. All gametes are chilled after collection and transported one-half mile to the hatchery facility for fertilization.

5.4) Incubation facilities.

The incubation room contains 14 16-tray stacks of vertical incubators (224 total trays) and 4 Sims trough incubators. Vertical incubators are supplied with 4 - 5 gpm of flow for each 16-tray stack. Sims trough incubators are used for eyeing only and are each supplied with 12 gpm of flow. Incubation water is supplied from shallow well and/or pumped surface water. Water supplies are soon to be alarmed (summer 2003), a backup

generator with automatic transfer equipment supplies emergency power to the site, and are linked to an alarm system with auto dialer system. Although the hatchery is not staffed 24 hours a day several hatchery staff live in very close proximity to the facility.

A separate incubation site consisting of 10 Netarts incubation/starting boxes supplied with gravity-flow spring water is also used for hatching and initial feeding. Each of the Netarts boxes is supplied with 20 – 30 gpm of flow.

5.5) Rearing facilities.

Kalama Creek is divided into three separate sites in order to maximize the use of the available water supplies. The main station consists of a hatchery building, three concrete raceways, and one asphalt-rearing pond. Water is supplied to the raceways and pond from two streamside pumps drawing water from Kalama Creek. Each of the concrete raceways is 8 feet wide and 80 feet long with an average water depth of 3.5 feet, providing 2240 cu. ft. of rearing space. Each is supplied with 250 gpm of flow. Water from the raceways can be discharged off the site or reused into the large rearing pond. The asphalt-rearing pond provides 30,000 cubic feet (cu. ft.) of rearing space and is supplied with 2000 gpm of flow, either first pass or up to 25% reuse from the raceways.

The Netarts rearing site consists of two small concrete raceways and 10 Netarts incubation/starting boxes. Water is supplied to this site from a series of small springs above the ponds and is gravity flow. Each of the concrete raceways provide 1150 cu. ft. of rearing space and are supplied with 166 gpm of flow. Each of the Netarts boxes provides 120 cu. ft. of rearing space and is supplied with 30 gpm of flow.

The lower rearing site consists of one large concrete adult collection and rearing pond. This pond provides 36,000 cu. ft. of rearing space and is supplied with 3000 gpm of gravity flow water the majority is reuse from the other two sites. All water flowing into this site is reconditioned through approximately 0.5 miles of wetland before being reused.

5.6) Acclimation/release facilities.

No separate off-station acclimation/release sites currently exist.

5.7) Describe operational difficulties or disasters that led to significant fish mortality.

Fish losses have occurred from improper operation of emergency power supply equipment and failure of dam boards in ponds. The generator is now on a scheduled test run weekly and regular maintenance is being done. In the fall of 2002 all dam boards were replaced to prevent additional fish losses. Substantial loss also occurred during the record Nisqually River flood in February 1996 when the site of flooded over.

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

This program does not directly take listed fish for brood stock. Risk aversion measures for equipment failure and water loss are described in Section 5.4 above

Adult fish are screened for pathogens in accordance with the guidelines of the "Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State", and routine fish health monitoring exams are conducted on a monthly basis by staff from the Fish Health staff of the Northwest Indian Fisheries Commission.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

6.1) Source. Broodstock for the program have come from chinook from several different Puget Sound hatchery facilities (unlisted stocks). A list of stocks used by brood year is shown below.

Brood Year	Stocks
1985	George Adams (Purdy)
1986	George Adams
1987	George Adams
1988	George Adams
1989	George Adams
1990	George Adams
1991	Wallace River 07.0940
1992	Clear Creek 11.0013c
1993	Skykomish/Clear Creek
1994	Kalama Creek
1995	Kalama Creek
1996	Kalama Creek
1997	Kalama Creek
1998	Minter Creek
1999	No Eggs Available from south sound stock
2000	Minter Creek
2001	Minter Creek Nisqually Return
2002	Soos Creek*

Minter Creek eggs were taken green to Clear Creek, brood Tested positive for VHS these eggs were disposed of on site And replacement eggs were taken at Soos Creek.

6.2) Supporting information.

6.2.1) History.

As stated in 6.1. The program stock was founded from several different Hood Canal and Puget Sound hatchery stocks. Because of poor survival and contribution of fish from this program, in 1998, the co-managers agreed to eliminate the use of the Skykomish origin stock and replace it with coho from a southern Puget Sound source, preferably Minter Creek. In 1999, no eggs were available from Minter Creek for this program. In 2000 Minter Creek stock was also utilized. In 2001 Minter Creek (Nisqually return) fish were used for brood stock. In 2002 Soos Creek eggs were used see explanation at asterisk in section 6.1.

6.2.2) Annual size.
There is currently no way to determine the extent of incorporation of natural fish into the hatchery brood stock. No natural spawning fish are deliberately captured for this purpose. With the plan to mass mark Coho beginning with BY 2002 if funding is available. In the future we will be able to determine NoR's at the hatchery rack.

6.2.3) Past and proposed level of natural fish in broodstock.
See 6.2.2. Above. No information is available regarding the annual number of natural fish incorporated in the brood stock due to the lack of marked fish.

6.2.4) Genetic or ecological differences.
This information is not currently known.

6.2.5) Reasons for choosing.
Choice of brood stock was based on stocks having the highest likelihood of similarities in genetic lineage, life history, as well being able to provide the number of eggs needed for production and a high likelihood of success in providing fishery benefits.

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.
Broodstock selection practices for this program will have no effect on listed natural stocks

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles).
All adults and jacks returning to the brood stock pond are collected.

7.2) Collection or sampling design.
Returning fish are captured at the hatchery pond located approximately 0.2 miles from the main stem Nisqually. The pond is operated between September and December and all returning adults and jacks are captured and sampled for Coded Wire Tags.

7.3) Identity.
There is currently no method available to identify the hatchery population from naturally produced Coho populations but we will in the years to come as we will start mass marking with BY 2002 if funding is available.

7.4) Proposed number to be collected:
Program needs are approximately 500 fish.

7.4.1) Program goal (assuming 1:1 sex ratio for adults):
Program needs are approximately 500 fish.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1990-2000), or for most recent years available:

Year	Adults Females	Males	Jacks	Eggs
1992	2033	3182	323	1,800,000
1993	(2638)*		630	1,030,000
1994	2106	1640	527	1,333,000
1995	658	658	288	982,590
1996	524	672	60	670,000
1997	614	1005	19	775,190
1998	(384)*		30	Minter Eggs used
1999	(242)*			No eggs available
2000	288	255	10	Minter Eggs used
2001	(1010)*			450,000
2002	0	0		Soos Creek eggs used**

* Total of both males and females together
**Minter Creek eggs taken , the brood tested positive for VHS. Eggs were buried and replacement eggs were acquired from Soos Creek.

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.
As stated previously, brood stock is collected from voluntary returns to the hatchery rack. No fish are passed up stream. When surplus of broodstock is available, adults are selected for spawning at random in proportion to return timing. Surplus eggs are sold unfertilized to an egg buyer for edible row.

7.6) Fish transportation and holding methods.
No transportation of adults is required. Adult returns are held in a 36,000 cubic foot pond supplied with approximately 3000 gpm of water. Adults typically enter the pond mature or nearly mature. Because of this, they are only held for a short period, one to two weeks, prior to spawning. Pre-spawning mortality is typically 2% or less. No prophylactic treatment of adults is necessary.

7.7) Describe fish health maintenance and sanitation procedures applied.
All returning adults are sampled in accordance with the "Salmonid Disease Control Policy of the Fisheries Co-managers of Washington State." All eggs taken are disinfected in accordance with the policy. Eggs are also disinfected after sorting and prior to being put down to hatch.

7.8) Disposition of carcasses.
After gamete collection, hatchery carcasses are distributed to tribal members, food banks and the general public. The carcass plants into the watershed follow guidelines developed by the Co-Managers fish health staff to reduce the risk of transfer or amplification of disease pathogens in the watershed.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.
No listed fish are collected for this program. Maintaining the adult collection facility on a tributary with a distinct water supply (in comparison to the Nisqually River main stem) will minimize the risk of adverse genetic or ecological effect to listed fish resulting from brood stock collection.

SECTION 8. MATING

8.1) Selection method.
Sorting and spawning takes place from 1 time per week. All ripe females encountered each day are selected for spawning unless there are obvious indications of non-viable eggs or the presence of pathogens such as bacterial kidney disease. Fish are spawned throughout the entire run. When the number of returning adults far exceeds the program capacity of the facility, spawners are chosen randomly over the run.

8.2) Males.
Males are selected randomly on each spawning day. The number of males spawned is the total return (if less than the number of females), or a number equal to the number of females spawned. No special effort is taken to select a specific proportion of precocious males. Instead, a minimum size is chosen for selecting males for spawning. This size includes some jacks (generally 2% - 5% of the total number of males) based on length frequencies of coded wire tag returns. No backup males have been used, and the number of males returning to the hatchery has been large enough to prevent the need for reusing spawners.

8.3) Fertilization.
Fertilization is accomplished using a modified 6X6 factorial spawning protocol. This process involves all eggs are pooled into 24 females per bucket. The buckets of 24 females are divided into fours smaller buckets containing ~6 females worth of eggs. These eggs are washed and mixed in the water/sodium bicarbonate solution then drained. Each bucket is then divided into 6 lots approximating the volume of 1 female, where they

are each fertilized by individual males. After 3-5 minutes these eggs are pooled back together then inventoried, prior to being water hardened in iodophore. All eggs are handled in accordance with the "Salmonid Disease Control Policy of the Fisheries Co-managers of Washington State."

8.4) Cryopreserved gametes.

None used.

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

The mating strategy described will minimize the likelihood of significant loss of genetic diversity in the hatchery stock. Collection of spawners throughout the run minimizes inadvertent selection for a particular portion of the run. Random mating minimizes artificial selection of the brood stock.

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

The station goal is to attain a survival of 90% from green egg to the eyed stage and a survival of 95% from the eyed stage to ponding.

9.1 Incubation

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

Brood Year	Egg Take	Green-Eyed Survival (%)	Eyed-Ponding Survival (%)
1988	1,630,000	84	47
1989	830,000	59(*)	
1990	1,510,000	76	66
1991	1,100,000	54(*)	
1992	1,800,000	37(*)	
1993	1,030,000	29(*)	
1994	3,530,000	70.3	
1995	982,590	82.5	
1996	670,100	92.7	98.1
1997	775,190	87.9	95
1998	320,000	93	96
1999	No eggs taken		
2000	350,000	Eyed egg Transfer	93.2
2001	450,000	94.5	95.2
2002	400,710	Eyed egg Transfer	96.5

* / Green to release survival

9.1.2) Cause for, and disposition of surplus egg takes.

Eggs in excess of program needs are taken when available to safeguard against potential incubation losses. Culling of excess eggs, if necessary, is done randomly over the entire egg take to maintain run timing and maximize the potential number of family crosses. Surplus green eggs are sold to an egg buyer for edible row. The culling of eyed eggs is done by burying them on site in upland wooded area's.

9.1.3) Loading densities applied during incubation.

Eggs are incubated to the eyed stage in Sims troughs. Standard loading is approximately 70,000 eggs per cell or 700,000 eggs/trough. Approximately 12 gpm of water is supplied to each trough. After removal of nonviable eggs at the eyed stage, eggs are inventoried into 16-tray vertical incubators supplied with 4 - 5 gpm of water each. Each tray is loaded with approximately 5600 eggs and contains artificial vexar substrate.

9.1.4) Incubation conditions.

Water supply to the incubators in monitored four to five times per day. Influent dissolved oxygen levels are at saturation, and effluent dissolved oxygen levels are within acceptable parameters. Incubation water for the hatchery building is supplied from pumped surface water. Incubation water at the Netarts site is supplied with gravity flow spring water.

9.1.5) Ponding.

Ponding is forced and takes place at between 1350 and 1450 accumulated temperature units. Ponding generally begins in January and continues as subsequent egg takes reach the proper stage of development. Eggs that may be incubated at the Netarts site are placed on vexar trays for hatching. These fish swim up from the substrate volitionally and are introduced to feed as they do.

9.1.6) Fish health maintenance and monitoring.

Eggs are treated daily with a fifteen minute formalin drip while in the Sims troughs. Nonviable eggs are removed by machine and hand picking once they have reached the eyed stage. Formalin treatment and removal of mortalities is discontinued once the eggs are transferred to vertical incubators, approximately ten to fourteen days prior to hatching.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

Incubation of coho eggs for this program will have no adverse genetic or ecological effects on listed chinook stocks.

9.2) Rearing:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available.

The average survival rate from ponding to release is about 95%.

9.2.2) Density and loading criteria (goals and actual levels).

Facilities and ponding procedures have been described in sections 5.5 and 9.1 above. Raceways are used for initial rearing for 4-5 months. Densities at the time fish are moved to the larger ponds are 0.4 lbs/cuft and 3.3 lbs/gal. Fish are then transferred to the asphalt pond for further rearing. Maximum density and loading at release from the rock pond are0.62 lbs/cuft and 7.9 lbs/gal.

9.2.3) Rearing conditions

Flows and pond loading rates have been provided in other sections. Rearing temperatures range from 39 – 49 degrees F, and average 48 degrees. Influent dissolved oxygen (D.O.) levels are at saturation and range from 11.2 – 11.6 ppm. Raceway effluent D.O. levels at maximum loading range from 9.5 – 10.1 ppm. Influent D.O. levels to the asphalt pond range from 10.2 – 11.6 ppm depending on the percentage of reuse water supplied to the pond. Effluent D.O. levels at maximum loading range from 8.6 – 10.0 ppm. Influent D.O. levels at the lower concrete pond range from 11.2 – 11.6 ppm after being reconditioned in the wetland. Effluent D.O. levels from this pond at maximum loading range from 9.5 – 9.9 ppm. Effluent D.O. levels from all rearing vessels remain above 80% of the saturation level.

Ponds are cleaned regularly using a vacuum pump. The frequency of cleaning is dependent on fish size, pond loading, and feeding levels, but generally is once per week in the raceways and twice per month in the large rearing ponds.

9.2.4) **Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.**

Time Period	Estimated Growth Rate % BW/day
2/1 – 5/30	2.2
6-1 – 4/31 (Release)	0.66

Condition factor for release year 2003 just prior to volitional release was 1.17

9.2.5) **Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available**.

Not available at this time but documentation is being gathered that will be included in future HGMP updates.

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

We have changed feed manufacture and feeding amounts to attempt to produce this more natural growth. Fish are reared on a commercial feed formulation produced by Moore-

Clark. First feeding is done with Nutra plus and food is fed by hand up to 8 times daily based on the willingness of the fish to accept it. Food size, frequency, and rates are slightly less then the manufacturer's recommendations for fish size and water temperature, until fish reach approximately 400 fish per pound. At this point feeding is reduced to approximately 1/3 ration or 1% body weight and fish are fed only five times per week until early spring. At 150 fpp diet is change to Clarks fry and feed is delivered once a day. Feed rations are then increased to 2% body weight so the population can have some good growth through out the summer. Beginning in the fall feed rates will lower to a level that will dramatically lower the growth rate while maintaining healthy fish. This will be in the area of ¾ % body weight three days per week. In the winter we will have a starvation period that is being planned in conjunction with the feed manufacture's recommendations. This starvation period will end depending on fish size to allow for a strong growth period to achieve target release size of 19fpp in April.

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.

The program goal is to maintain fish health through proper rearing densities, hygiene, and the use of vaccination. Additionally, fish health is monitored on a monthly basis by pathologists from the tribal fish health center. Disease treatments, if necessary, are conducted under the direction of these specialists based on their findings.

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

Information not available

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

No aspect of "natural rearing" is being applied to this program but the Coho program at Clear Creek are receiving some elements of "semi-natural rearing", along with a well designed study being evaluated on a pond of Clear Creek Chinook. The results of this study which is currently in it's third year will effect future Nisqually tribal decisions regarding "Natural Rearing and it's success at returning more fish to the fisheries.

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

Fish are reared to 1+ age smolt size to mimic the natural fish emigration strategy and minimize the potential for domestication effects.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs	N/A	N/A	N/A	N/A
Unfed Fry	N/A	N/A	N/A	N/A
Fry	N/A	N/A	N/A	N/A
Fingerling	N/A	N/A	N/A	N/A
Yearling	350,000	19	4-1 thru 5-1	Kalama Creek

10.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse: Kalama Creek (11.0017A)
Release point: Kalama Creek RM 0.2 (Nisqually RM 9.2)
Major watershed: Nisqually River
Basin or Region: Puget Sound

10.3) Actual numbers and sizes of fish released by age class through the program.

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1990							490,000	19
1991							495,000	19
1992							475,000	19
1993			141,400	235			450,000	14
1994			266,000	580			400,696	19
1995							294,800	14
1996							446,366	31.5
1997			180,968	521			46,018	18
1998							421,000	17
1999			246,619	393			221,211	17
2000							295,000	14
2001							No releases	
2002							398,200	17
Average			208,746	432			433,260	16.8

10.4) Actual dates of release and description of release protocols.
Yearlings have been released from the first of April through the end of April. The release is volitional until the pond population is reduced to a level that feeding is impossible. Those fish, generally only a few thousand, are ultimately forced out. The most recent five-year release dates are provided below. All egg, fry and fingerling releases will be discontinued to reduce the potential competition with naturally produced fall Chinook.

Release Year	**Fingerling Release Dates**	**Yearling Release Dates**
1997	**4/3 – 4/15**	**4/1 – 4/9**
1998		**4/14 – 4/24**
1999	**3/2 – 4/19**	**4/1 – 4/14**
2000		**3/23 – 4/21**
2001		**4/2 – 4/28**
2002		**4/7 – 4/28**

10.5) Fish transportation procedures, if applicable.
N/A

10.6) Acclimation procedures (*methods applied and length of time***).**
N/A

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.
The proportion of fish marked has varied from 10.60% to 17.4 % from 1985 thru 1994 years.

Release Year	% of Fingerlings Marked/Tagged
1985	16.6
1986	10.5
1987	11.7
1988	10.5
1989	10.6
1990	10.6
1991	11.5
1992	13.4
1993	17.4
1994	13.4
1996	22.0
1997	0
1998	22.06
1999	20.56
2000	16.71
2001	No releases
2002	8.13

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

Proper inventory techniques particularly at the egg stage should prevent surplus occurring. Should this not be adequate, surplus fish would be killed or released in approved landlocked areas.

10.9) Fish health certification procedures applied pre-release.

Juvenile fish are examined monthly up to the time of release.

10.10) Emergency release procedures in response to flooding or water system failure.

Flooding levels are not predictable enough on the Nisqually River to foresee the need to release fish. In addition, purposely-releasing fish into a flooding river is probably not as effective as attempting to maintain the integrity of the ponds and water supply system. In the event of a water system failure, however, only the minimum number of fish necessary would be released in order to protect the health of the remaining population.

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

Coho salmon are volitionally released as actively migrating yearling smolts from the first of April through the end of April in the lower 9.2 miles of the river. This measure should minimize the likelihood for interaction and adverse ecological effects to listed chinook juveniles. With the discontinuation of egg, fry and fingerling plants risks of negative interactions will be reduced.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

Performance Indicator	Monitoring and evaluation
Treaty harvest in in-river fishery is on average between 10-15,000 adult coho.	Fish Tickets
A minimum of 500 adults return to hatchery rack annually for brood stock	Count rack return.
Estimated escapement of natural spawners on average reaches goal of 4,000 adults	Spawning survey estimates
The rate of fertilization and survival from egg to smolt provides for production goal of 350,000 yearling smolts	Hatchery records
Implement modified 6*6 factorial spawning protocol	See section 8.3

Brood stock collected through-out timing of migration to the rack, from mid September to early December	Hatchery records
Due to coho currently not being mass marked there is no way to identify Hatchery strays. It is our intention to begin mass marking with BY 2002.	Implement coho mass marking in 2003 if funding is available, sample returning jacks and adults for marked fish
Hatchery smolt size is maintained at minimum of 19 per pound to maximize probability of immediate out migration	Hatchery records
Hatchery smolts volitionally released below RM 9.2 to minimize interaction with natural out migrating smolts	Hatchery records

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

Funding for monitoring and evaluation are expected to be available.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

No adverse genetic or ecological effects to Nisqually fall chinook will result from monitoring or evaluation activities.

SECTION 12. RESEARCH

12.1) Objective or purpose.

In 2002 the Tribe began conducted a pilot study to determine juvenal salmonids utilization in the lower river and in the estuary. The objective is to determine potential co-occurrence (predation and competition), timing, size, diet, number estimates, and habitat types used.

12.2) Cooperating and funding agencies.

Hatchery reform funds from NWIFC were used for this pilot study in 2002 and they were successful at receiving additional funding for 2003.

12.3) Principle investigator or project supervisor and staff.

Sayre Hodgson – Nisqually Tribe Research Biologist

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

Same stock as listed in section 2

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

Sample site were chosen to represent various habitat types and spatial area's. Samples were taken with fyke nets and beach seines bi-weekly. Samples were identified and

enumerated by species and sub-samples were measured for length. Sub-samples are taken for stomach content. Clove oil is being used as anesthetic.

12.6) Dates or time period in which research activity occurs.
April 1 to August 29 2002, (Planned) February 28 to August 31 2003

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.
Samples are carefully and rapidly processed. Holding duration is held to a minimum usually less then ten minutes in buckets. Anesthetized fish are put into a recovery bucket.

12.8) Expected type and effects of take and potential for injury or mortality.
2002 results– 1,966 chinook sampled 1,683 were hatchery marked. 22 lethal samples 18 were marked hatchery fish. 28 incidental mortality 24 of which were marked hatchery fish. 4 incidental mortality were also used as lethal samples. Total known take of Chinook was 46 chinook 28 of which were marked hatchery fish, 18 were un-marked chinook

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table"
Take is for research and has been accounted for under the NWIFC research section of the 4d exemption.

12.10) Alternative methods to achieve project objectives.
This research is believed to be the best way possible to achieve the information desired.

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.
Results from 2002 Estuary study:
109 Coho sampled, 39 Cutthroat sampled, 1,174 Chum sampled
Incidental mortality of 10 Chum and the 18 un-marked chinook(see section 12.8)

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.
Steps to minimize adverse effects of sampling study include: quickly and gently removing fish from nets, not fully removing cod-end of the beach seine from the water, and monitoring very closely the condition of the fish after capture, the water temperature in which they are being held, and that they are fully resuscitated from the anesthetic prior to release.

SECTION 13. ATTACHMENTS AND CITATIONS

Include all references cited in the HGMP. In particular, indicate hatchery databases used to provide data for each section. Include electronic links to the hatchery databases used (if feasible), or to the staff person responsible for maintaining the hatchery database referenced (indicate email address). Attach or cite (where commonly available) relevant reports that

describe the hatchery operation and impacts on the listed species or its critical habitat. Include any EISs, EAs, Biological Assessments, benefit/risk assessments, or other analysis or plans that provide pertinent background information to facilitate evaluation of the HGMP.

1. CRAS Coded Wire Tag Retrieval and Analysis System
   Nisqually Fall Chinook CWT Summary Reports Brood Years 82 – 93
   Nisqually Fall Chinook CWT Recovery Distribution Reports Brood Years 82 – 93
   Nisqually Fall Chinook Freshwater Recovery Reports Brood Years 82 - 93
2. Draft Nisqually Basin Fall Chinook Recovery Plan, September 1999
3. Northwest Indian Fisheries Commission Release Records

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

Table 1. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Fall Chinook _____ ESU/Population: Puget Sound/Nisqually River_____ Activity: See Below_____				
Location of hatchery activity: _Nisqually River_____ Dates of activity:_____ Hatchery program operator:_Nisqually Tribe____				
	Annual Take of Listed Fish By Life Stage *(Number of Fish)*			
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)				
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)			Unkown	
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

Instructions:

1. An entry for a fish to be taken should be in the take category that describes the greatest impact.
2. Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).
3. If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.